

# Computational Modeling aided Near Net Shape Manufacturing for Aluminum Alloys, Phase I

Completed Technology Project (2012 - 2012)

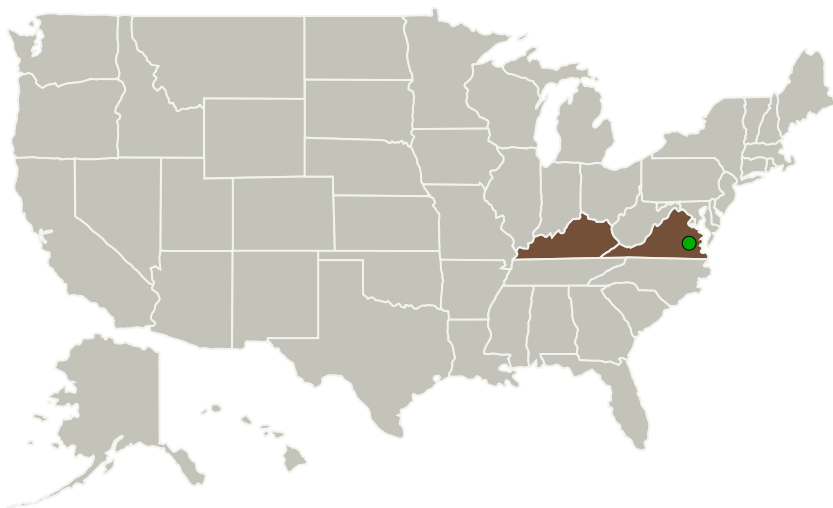


## Project Introduction

This program will focus on developing and validating computational models for near-net shape processing of aluminum alloys. Computational models will be developed for deformation modeling and for texture generation.

Characterization of two aluminum alloys including flow stress, forgeability, and recrystallization characteristics will provide input for the models. The models will be validate through laboratory scale testing of the ring rolling process. The two aluminum alloys are 2139, which has time strength and fracture toughness and ATI451a variant of 2139 that has excellent T6 temper properties. The models will be used to simulate full scale deformation and predict the nonisentropic material properties of the deformed product. Successful completion of this effort will enhance NASA's ability to implement near-net shape manufacturing processes, evaluate new materials and reduce the cost and weight of space exploration vehicles.

## Primary U.S. Work Locations and Key Partners



Computational Modeling aided Near Net Shape Manufacturing for Aluminum Alloys, Phase I

## Table of Contents

Project Introduction	1
Primary U.S. Work Locations and Key Partners	1
Project Transitions	2
Organizational Responsibility	2
Project Management	2
Technology Maturity (TRL)	2
Technology Areas	3
Target Destinations	3

## Computational Modeling aided Near Net Shape Manufacturing for Aluminum Alloys, Phase I

Completed Technology Project (2012 - 2012)



Organizations Performing Work	Role	Type	Location
ATI Inc	Lead Organization	Industry Minority-Owned Business, Small Disadvantaged Business (SDB)	Lexington, Kentucky
● Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia

## Primary U.S. Work Locations

Kentucky	Virginia
----------	----------

## Project Transitions

**February 2012:** Project Start**August 2012:** Closed out

## Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/138057>)

## Organizational Responsibility

**Responsible Mission Directorate:**

Space Technology Mission Directorate (STMD)

**Lead Organization:**

ATI Inc

**Responsible Program:**

Small Business Innovation Research/Small Business Tech Transfer

## Project Management

**Program Director:**

Jason L Kessler

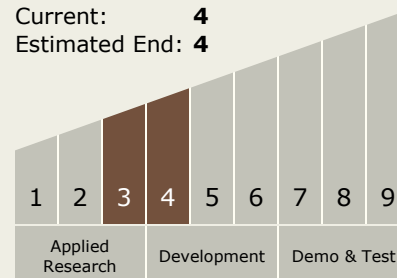
**Program Manager:**

Carlos Torrez

**Principal Investigator:**

Alex Cho

## Technology Maturity (TRL)

Start: **3**Current: **4**Estimated End: **4**

# Computational Modeling aided Near Net Shape Manufacturing for Aluminum Alloys, Phase I

Completed Technology Project (2012 - 2012)



## Technology Areas

### Primary:

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
  - └ TX12.3 Mechanical Systems
    - └ TX12.3.3 Design and Analysis Tools and Methods

## Target Destinations

Earth, The Moon, Others Inside the Solar System, Outside the Solar System, The Sun, Mars